



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION 5 CHICAGO REGIONAL LABORATORY
 536 SOUTH CLARK STREET
 CHICAGO, ILLINOIS 60605

Date: 9/2/2014

Subject: Review of Region 5 Data for Eisenbarth Well Pad - Stat Oil Company

To: R5 Emergency Response Branch
 77 W Jackson Blvd
 Chicago, IL 60604

From: Lawrence Zintek, Group Leader
 US EPA Region 5 Chicago Regional Laboratory

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with EPA's *Guidance on Environmental Data Verification and Data Validation* (Document EPA QA/G-8), CRL verified and validated the data but does not perform data quality assessment based on project plans.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X  9/2/14

Please contact the analyst with any technical report issues, Amanda Wroble at (312)-353-0375 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

Attached are Results for: Eisenbarth Well Pad - Stat Oil Company

 Data Management Coordinator and Date Transmitted

Analyses included in this report:

TTPC

TTPC



Environmental Protection Agency Region 5 Chicago Regional Laboratory

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R5 Emergency Response Branch
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Chicago IL, 60604

Project: Eisenbarth Well Pad - Stat Oil Company
Project Number: [none]
Project Manager: James Justice

Reported:
Sep-02-14 13:06

ANALYSIS CASE NARRATIVE

General Information

The laboratory received five soil samples between July 18th and 31st, 2014 for (Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) analysis. Analysis of TTPC in soil by LC/MS/MS was carried out using CRL SOP OM17, Revision 0. The samples were analyzed August 7-8, 2014. A holding time study was not done for TTPC, any time limit stated is arbitrary. In the absence of a customer-specified Data Quality Objectives, the Chicago Regional Laboratory defaults to the analytical Standard Operating Procedure (SOP) reporting limits. The data reported herein met the reporting limit referenced in the SOP. The analyst for these samples, Larry Zintek, can be reached at (312) 886-2925.

Sample Analysis and Results

Sample 1407021-01, -02 and 1408003-12 were gravel like with small particulate sediments. Sample 1407021-02 was used for the duplicate, matrix spike and matrix spike duplicate. The subsamples from 1407021-02 were not of consistent composition in respect to gravel and sediments. Sample 1408003-11 was treated as a soil even though it was a thick white paste material. Sample 1408003-04 was mud-like and of a consistent composition.

Quality Control

No surrogate is presently available for this analysis but has been ordered. All site sample data is qualified estimated "J" because there is no surrogate quality control.

All control limits are preliminary because this is a new SOP and initial data is minimal and insufficient to determine historical acceptance criteria over the course of a longer period. The quality control is based on these initial control limits, which may be more restrictive, resulting in an increase of outlier data. The control limits will be revised when more data is collected.

All Quality Control (QC) audits were within CRL limits for the analytes or did not result in qualification of the data except for the following:

Reporting Limit Check Samples

Two quality control samples, B408082-MRL1 and -MRL2 were spiked at the reporting limit to determine if TTPC was present at the reporting limit it would be identified and quantitated. The percent recovery control limits for these samples is 86-113%. The recovery for B408082-MRL1 was 84.5% and for B408082-MRL2 was 77.2%, slightly biased low, all data is properly qualified.



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Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Sample 1407021-02 was used for the duplicate, matrix spike and matrix spike duplicate. The duplicate did not meet the relative percent difference (RPD) criteria in the SOP, the RPD was 40.6%. The sample was of an inconsistent matrix with much gravel and silt so a homogeneous subsample was difficult to obtain. The MS/MSD samples met the RPD criteria but did not meet the percent recovery criteria. The concentration in the native unspiked sample, 1407021-02, was 140,000 ng/Kg. The concentration in the duplicate, B408082-DUP1, was 211,000 ng/Kg. The spike concentration was approximately 3,800 ng/Kg for B408082-MS1 and 2,700 ng/Kg for B408082-MSD1 which is negligible to what was found in the native sample. The percent recovery in the matrix spike samples is not relevant due to the variability in the sample matrix and the low concentration spike compared to the native sample concentration.

Signature

Date 9/2/14

ANALYSIS CASE NARRATIVE

General Information

The laboratory received fifteen water samples between July 18th and 31st, 2014 for (Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) analysis. Analysis of TTPC in water by LC/MS/MS was carried out using CRL SOP OM16, Revision 0. The samples were split into three small batches, each with their own quality control, B408085, B408086 and B408087. A holding time study was not done for TTPC, any holding time limit is arbitrary. In the absence of a customer-specified Data Quality Objectives, the Chicago Regional Laboratory defaults to the analytical Standard Operating Procedure (SOP) reporting limits. The data reported herein met the reporting limit referenced in the SOP. The analyst for these samples, Larry Zintek, can be reached at (312) 886-2925.

Sample Analysis and Results

The site samples were of varying concentrations requiring up to a 10,000 fold dilution. A small aliquot of sample was used from each container for the analysis in order to save enough of the sample for further analysis.

Quality Control

No surrogate is presently available for this analysis but has been ordered. All site sample data is qualified estimated "J" because there is no surrogate quality control.



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All control limits are preliminary because this is a new SOP and initial data is minimal and insufficient to determine historical acceptance criteria over the course of a longer period. The quality control is based on these initial control limits, which may be more restrictive, resulting in an increase of outlier data. The control limits will be revised when more data is collected.

All Quality Control (QC) audits were within CRL limits for the analytes or did not result in qualification of the data except for the following:

Reporting Limit Check Samples

Batch B408086

Two quality control samples, B408086-MRL1 and -MRL2 were spiked at the reporting limit to determine if TTPC was present at the reporting limit it would be identified and quantitated. The percent recovery control limits for these samples is 86-113%. The recovery for B408086-MRL1 was 77.7% and for B408086-MRL2 was 77.9%, slightly biased low, all data is properly qualified.

Batch B408087

Two quality control samples, B408087-MRL1 and -MRL2 were spiked at the reporting limit to determine if TTPC was present at the reporting limit it would be identified and quantitated. The percent recovery control limits for these samples is 86-113%. The recovery for B408087-MRL1 was 65.7% and for B408086-MRL2 was 85.5%, biased low, all data is properly qualified.

Laboratory Control Spike/Laboratory Control Spike Duplicate Samples

Batch B408085

Two quality control samples, B408085-BS1 and -BSD1 were spiked near the midpoint to assess recovery near the midpoint of the reporting range. The percent recovery control limits for these samples is 87.9-101.4%. The recovery for B408085-BS1 was 108% and for B408085-BSD1 was 103%, slightly biased high, all data is properly qualified.

Batch B408086

Two quality control samples, B408086-BS1 and -BSD1 were spiked near the midpoint to assess recovery near the midpoint of the reporting range. The percent recovery control limits for these samples is 87.9-101.4%. The recovery for B408086-BS1 was 75.1% and for B408086-BSD1 was 78.6%, slightly biased low, all data is properly



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qualified.

Batch B408087

Two quality control samples, B408087-BS1 and -BSD1 were spiked near the midpoint to assess recovery near the midpoint of the reporting range. The percent recovery control limits for these samples is 87.9-101.4%. The recovery for B408087-BS1 and B408087-BSD1 was 87.7% and 83%, respectively, slightly biased low, all data is properly qualified.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Batch B408085

Sample 1408004-01 was used for a matrix spike sample. A matrix spike duplicate sample was not analyzed. Spike recovery for B408085-MS1 was 107% which was biased slightly high based upon the percent recovery control limits of 87.9-101.4%, the native unspiked sample was non-detect at the reporting limit so no qualification based upon a high biased result is required.

Batch B408086

Sample 1408003-10 was used for the matrix spike and matrix spike duplicate. The MS/MSD samples did not meet the recovery criteria. Spike recoveries for B408086-MS1 and B408086-MSD1 were 66.9% and 72.8% respectively which were biased low based upon the percent recovery control limits of 87.9-101.4%, all data is properly qualified.

Batch B408087

Sample 1407021-03 was used for the matrix spike and matrix spike duplicate. Spike recoveries for B408087-MS1 and B408087-MSD1 were 76.5% and 88.8% respectively which -MS1 was biased low based upon the percent recovery control limits of 87.9-101.4%, no qualification is required based upon this one outlier.

Duplicate

Batch B408087

Sample 1408003-02 was used as the duplicate for B408087-DUP2. The duplicate sample was in a different vial than the sample. The result for the sample 1408003-02 was 15,100 ng/L and for the duplicate, B408087-DUP2, was 10,800 ng/L which does not pass the RPD criteria of 30%. These samples were co-located and not true duplicates. The data is qualified.



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Signature

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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EWF-SW18-072914	1407021-01	Soil	Jul-29-14 12:05	Jul-31-14 10:00
EWF-SW25-072914	1407021-02	Soil	Jul-29-14 14:30	Jul-31-14 10:00
EWF-SW25-072914	1407021-03	Water	Jul-29-14 14:40	Jul-31-14 10:00
EWF-SW18-072914	1407021-04	Water	Jul-29-14 12:05	Jul-31-14 10:00
EWF-SUMP11-072814	1407021-05	Water	Jul-28-14 17:15	Jul-31-14 10:00
EWF-SUMP13-072814	1407021-06	Water	Jul-28-14 17:40	Jul-31-14 10:00
WTR-01	1408003-01	Water	Jun-28-14 21:53	Jul-18-14 13:56
WTR-02	1408003-02	Water	Jun-28-14 22:21	Jul-18-14 13:56
WTR-03	1408003-03	Water	Jun-29-14 03:10	Jul-18-14 13:56
EWF-070214-SD-01	1408003-04	Soil	Jul-02-14 11:05	Jul-18-14 13:56
EWF-070214-SW-01	1408003-05	Water	Jul-02-14 10:50	Jul-18-14 13:56
EWF-070314-NW-01	1408003-06	Water	Jul-03-14 10:00	Jul-18-14 13:56
EWF-070414-SWDL-01	1408003-07	Water	Jul-04-14 13:50	Jul-18-14 13:56
EWF-070414-SW-003	1408003-08	Water	Jul-04-14 18:30	Jul-18-14 13:56
EWF-070514-NW-Sump	1408003-09	Water	Jul-05-14 15:30	Jul-18-14 13:56
EWF-070914-NW-Outfall003	1408003-10	Water	Jul-09-14 11:45	Jul-18-14 13:56
EWF-070914-SE-SUMP-01	1408003-11	Soil	Jul-09-14 16:41	Jul-18-14 13:56
EWF-070214-SD-02	1408003-12	Soil	Jul-02-14 11:05	Jul-18-14 13:56
EWF-070914-NW-Outfall003	1408003-13	Water	Jul-09-14 11:45	Jul-18-14 13:56
EWF-070514-SW-Cell	1408004-01	Water	Jul-05-14 10:30	Jul-26-14 00:00



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(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis US EPA Region 5 Chicago Regional Laboratory

EWF-SW18-072914 (1407021-01) Soil Sampled: Jul-29-14 12:05 Received: Jul-31-14 10:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	2.99E6	J		4.27E5	ng/kg dry	1000	B408082	Aug-07-14	Aug-07-14

EWF-SW25-072914 (1407021-02) Soil Sampled: Jul-29-14 14:30 Received: Jul-31-14 10:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	1.40E5	J		40900	ng/kg dry	100	B408082	Aug-07-14	Aug-07-14

EWF-SW25-072914 (1407021-03) Water Sampled: Jul-29-14 14:40 Received: Jul-31-14 10:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	U	J		100	ng/L	1	B408087	Aug-05-14	Aug-05-14

EWF-SW18-072914 (1407021-04) Water Sampled: Jul-29-14 12:05 Received: Jul-31-14 10:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	113	J		100	ng/L	1	B408087	Aug-05-14	Aug-05-14

EWF-SUMP11-072814 (1407021-05) Water Sampled: Jul-28-14 17:15 Received: Jul-31-14 10:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	4.96E5	J		20000	ng/L	200	B408087	Aug-05-14	Aug-05-14

EWF-SUMP13-072814 (1407021-06) Water Sampled: Jul-28-14 17:40 Received: Jul-31-14 10:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	226	J		100	ng/L	1	B408087	Aug-05-14	Aug-06-14

WTR-01 (1408003-01) Water Sampled: Jun-28-14 21:53 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	2.73E5	J		20000	ng/L	200	B408086	Aug-04-14	Aug-04-14



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(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis US EPA Region 5 Chicago Regional Laboratory

WTR-02 (1408003-02) Water Sampled: Jun-28-14 22:21 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	15100	J		1000	ng/L	10	B408087	Aug-05-14	Aug-05-14

WTR-03 (1408003-03) Water Sampled: Jun-29-14 03:10 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	1.19E5	J		5000	ng/L	50	B408085	Jul-29-14	Jul-29-14

EFW-070214-SD-01 (1408003-04) Soil Sampled: Jul-02-14 11:05 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	7.22E7	J		6.72E6	ng/kg dry	10000	B408082	Aug-07-14	Aug-08-14

EFW-070214-SW-01 (1408003-05) Water Sampled: Jul-02-14 10:50 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	4630	J		2000	ng/L	20	B408086	Aug-04-14	Aug-04-14

EFW-070314-NW-01 (1408003-06) Water Sampled: Jul-03-14 10:00 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	981	J		100	ng/L	1	B408085	Jul-29-14	Jul-29-14

EFW-070414-SWDL-01 (1408003-07) Water Sampled: Jul-04-14 13:50 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	3.45E7	J		1.00E6	ng/L	10000	B408085	Jul-29-14	Aug-04-14

EFW-070414-SW-003 (1408003-08) Water Sampled: Jul-04-14 18:30 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	193	J		100	ng/L	1	B408085	Jul-29-14	Jul-30-14



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(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis US EPA Region 5 Chicago Regional Laboratory

EWF-070514-NW-Sump (1408003-09) Water Sampled: Jul-05-14 15:30 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	816	J		100	ng/L	1	B408085	Jul-29-14	Jul-29-14

EWF-070914-NW-Outfall003 (1408003-10) Water Sampled: Jul-09-14 11:45 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	U	J		100	ng/L	1	B408086	Aug-04-14	Aug-04-14

EWF-070914-SE-SUMP-01 (1408003-11) Soil Sampled: Jul-09-14 16:41 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	7.39E8	J		1.97E7	ng/kg dry	1000	B408082	Aug-07-14	Aug-07-14

EWF-070214-SD-02 (1408003-12) Soil Sampled: Jul-02-14 11:05 Received: Jul-18-14 13:56

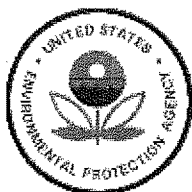
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	1.03E5	J		23500	ng/kg dry	100	B408082	Aug-07-14	Aug-07-14

EWF-070914-NW-Outfall003 (1408003-13) Water Sampled: Jul-09-14 11:45 Received: Jul-18-14 13:56

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	1770	J		500	ng/L	5	B408085	Jul-29-14	Jul-30-14

EWF-070514-SW-Cell (1408004-01) Water Sampled: Jul-05-14 10:30 Received: Jul-26-14 00:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
TTPC	U	J		100	ng/L	1	B408085	Jul-29-14	Aug-04-14



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(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis - Quality Control US EPA Region 5 Chicago Regional Laboratory

Batch B408082 - *** DEFAULT PREP ***

Blank (B408082-BLK1)

Prepared & Analyzed: Aug-07-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	U			250	ng/kg						

Blank (B408082-BLK2)

Prepared & Analyzed: Aug-07-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	U			250	ng/kg						

LCS (B408082-BS1)

Prepared & Analyzed: Aug-07-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1990			250	ng/kg	2500		79.8%	68-103		

LCS Dup (B408082-BSD1)

Prepared & Analyzed: Aug-07-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	2070			250	ng/kg	2500		82.9%	68-103	3.80	30

Duplicate (B408082-DUP1)

Source: 1407021-02

Prepared & Analyzed: Aug-07-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	2.11E5	J		37400	ng/kg dry		1.40E5			40.6	30

MRL Check (B408082-MRL1)

Prepared & Analyzed: Aug-07-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	211			250	ng/kg	250.0		84.5%	86-113		

MRL Check (B408082-MRL2)

Prepared & Analyzed: Aug-07-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	193			250	ng/kg	250.0		77.2%	86-113		



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(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis - Quality Control US EPA Region 5 Chicago Regional Laboratory

Batch B408082 - *** DEFAULT PREP ***

Matrix Spike (B408082-MS1)				Source: 1407021-02				Prepared & Analyzed: Aug-07-14			
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1.70E5	J		38500	ng/kg dry	3848	1.40E5	795%	68-103		

Matrix Spike Dup (B408082-MSD1)				Source: 1407021-02				Prepared & Analyzed: Aug-07-14			
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1.82E5	J		26800	ng/kg dry	2685	1.40E5	NR	68-103	6.66	30

Batch B408085 - *** DEFAULT PREP ***

Blank (B408085-BLK1)				Prepared & Analyzed: Jul-29-14							
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	U			100	ng/L						

Blank (B408085-BLK2)				Prepared & Analyzed: Jul-29-14							
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	U			100	ng/L						

LCS (B408085-BS1)				Prepared & Analyzed: Jul-29-14							
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	2160			100	ng/L	2000		108%	87.9-101.4		

LCS Dup (B408085-BSD1)				Prepared & Analyzed: Jul-29-14							
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	2070			100	ng/L	2000		103%	87.9-101.4	4.37	30

Duplicate (B408085-DUP1)				Source: 1408003-03				Prepared & Analyzed: Jul-29-14			
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1.46E5	J		5000	ng/L		1.19E5			20.2	30



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R5 Emergency Response Branch
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Chicago IL, 60604

Project: Eisenbarth Well Pad - Stat Oil Company
Project Number: [none]
Project Manager: James Justice

Reported:
Sep-02-14 13:06

(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis - Quality Control US EPA Region 5 Chicago Regional Laboratory

Batch B408085 - *** DEFAULT PREP ***

MRL Check (B408085-MRL1)

Prepared & Analyzed: Jul-29-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	102			100	ng/L	100.0		102%	86-113		

MRL Check (B408085-MRL2)

Prepared & Analyzed: Jul-29-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	108			100	ng/L	100.0		108%	86-113		

Matrix Spike (B408085-MS1)

Source: 1408004-01

Prepared & Analyzed: Jul-29-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	2150	J		500	ng/L	2000	14.7	107%	87.9-101.4		

Batch B408086 - *** DEFAULT PREP ***

Blank (B408086-BLK1)

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	U			100	ng/L						

Blank (B408086-BLK2)

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	U			100	ng/L						

LCS (B408086-BS1)

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1500			100	ng/L	2000		75.1%	87.9-101.4		

LCS Dup (B408086-BSD1)

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit



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Reported:
Sep-02-14 13:06

(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis - Quality Control US EPA Region 5 Chicago Regional Laboratory

Batch B408086 - *** DEFAULT PREP ***

LCS Dup (B408086-BSD1)

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1570			100	ng/L	2000		78.6%	87.9-101.4	4.58	30

Duplicate (B408086-DUP1)

Source: 1408003-10

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	68.4	J		100	ng/L		69.4			1.45	30

Duplicate (B408086-DUP2)

Source: 1408003-01

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	2.80E5	J		20000	ng/L		2.73E5			2.52	30

Duplicate (B408086-DUP3)

Source: 1408003-05

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	3540	J		2000	ng/L		4630			26.6	30

MRL Check (B408086-MRL1)

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	77.7			100	ng/L	100.0		77.7%	86-113		

MRL Check (B408086-MRL2)

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	77.9			100	ng/L	100.0		77.9%	86-113		

Matrix Spike (B408086-MS1)

Source: 1408003-10

Prepared & Analyzed: Aug-04-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1410	J		100	ng/L	2000	69.4	66.9%	87.9-101.4		



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Project: Eisenbarth Well Pad - Stat Oil Company
Project Number: [none]
Project Manager: James Justice

Reported:
Sep-02-14 13:06

(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis - Quality Control US EPA Region 5 Chicago Regional Laboratory

Batch B408086 - *** DEFAULT PREP ***

Matrix Spike Dup (B408086-MSD1)			Source: 1408003-10			Prepared & Analyzed: Aug-04-14					
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	Limits	RPD	Limit
TTPC	1530	J		100	ng/L	2000	69.4	72.8%	87.9-101.4	8.08	30

Batch B408087 - *** DEFAULT PREP ***

Blank (B408087-BLK1)			Prepared & Analyzed: Aug-05-14								
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	Limits	RPD	Limit
TTPC	U			100	ng/L						

Blank (B408087-BLK2)			Prepared & Analyzed: Aug-05-14								
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	Limits	RPD	Limit
TTPC	U			100	ng/L						

LCS (B408087-BS1)			Prepared & Analyzed: Aug-05-14								
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	Limits	RPD	Limit
TTPC	1750			100	ng/L	2000		87.7%	87.9-101.4		

LCS Dup (B408087-BSD1)			Prepared & Analyzed: Aug-05-14								
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	Limits	RPD	Limit
TTPC	1660			100	ng/L	2000		83.0%	87.9-101.4	5.46	30

Duplicate (B408087-DUP1)			Source: 1407021-03			Prepared & Analyzed: Aug-05-14					
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	Limits	RPD	Limit
TTPC	U	J		100	ng/L		U				30

Duplicate (B408087-DUP2)			Source: 1408003-02			Prepared & Analyzed: Aug-05-14					
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	Limits	RPD	Limit
TTPC	10800	J		1000	ng/L		15100			32.9	30



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Project: Eisenbarth Well Pad - Stat Oil Company
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Project Manager: James Justice

Reported:
Sep-02-14 13:06

(Tri-n-butyl)-n-tetradecylphosphonium chloride (TTPC) Analysis - Quality Control US EPA Region 5 Chicago Regional Laboratory

Batch B408087 - *** DEFAULT PREP ***

MRL Check (B408087-MRL1)

Prepared & Analyzed: Aug-05-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	65.7			100	ng/L	100.0		65.7%	86-113		

MRL Check (B408087-MRL2)

Prepared & Analyzed: Aug-05-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	85.5			100	ng/L	100.0		85.5%	86-113		

Matrix Spike (B408087-MS1)

Source: 1407021-03

Prepared & Analyzed: Aug-05-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1530	J		100	ng/L	2000	U	76.5%	87.9-101.4		

Matrix Spike Dup (B408087-MSD1)

Source: 1407021-03

Prepared & Analyzed: Aug-05-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
TTPC	1780	J		100	ng/L	2000	U	88.8%	87.9-101.4	14.9	30



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Reported:
Sep-02-14 13:06

Notes and Definitions

J The identification of the analyte is acceptable; the reported value is an estimate.
U Not Detected
NR Not Reported

